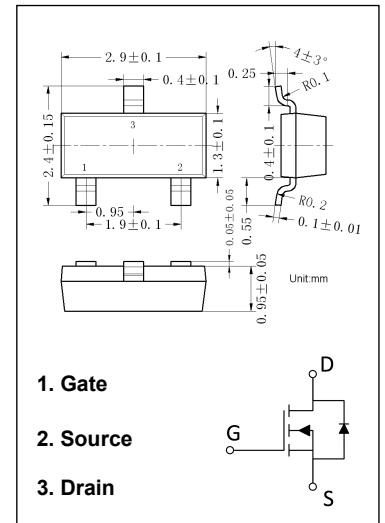


## SOT-23 Plastic-Encapsulate Mosfets

### AO3400 N-Channel Mosfet

#### Features

- $V_{DS}$  30V
- $I_D$  (at  $V_{GS}=10V$ ) 5.7A
- $R_{DS(ON)}$  (at  $V_{GS}=10V$ ) < 26.5m
- $R_{\Omega DS(ON)}$  (at  $V_{GS} = 4.5V$ ) < 32m
- $R_{\Omega DS(ON)}$  (at  $V_{GS} = 2.5V$ ) < 48m  $\Omega$



#### Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

| Symbol         | Parameter                              | Maximum                | Units            |
|----------------|----------------------------------------|------------------------|------------------|
| $V_{DS}$       | Drain-Source Voltage                   | 30                     | V                |
| $V_{GS}$       | Gate-Source Voltage                    | $\pm 12$               | V                |
| $I_D$          | Continuous Drain Current               | $T_A=25^\circ\text{C}$ | A                |
|                |                                        | $T_A=70^\circ\text{C}$ |                  |
| $I_{DM}$       | Pulsed Drain Current <sup>C</sup>      | 30                     |                  |
| $P_D$          | Power Dissipation <sup>B</sup>         | $T_A=25^\circ\text{C}$ | W                |
|                |                                        | $T_A=70^\circ\text{C}$ |                  |
| $T_J, T_{STG}$ | Junction and Storage Temperature Range | 55 to 150              | $^\circ\text{C}$ |

#### Thermal Characteristics

| Symbol          | Parameter                                  | Typ | Max | Units              |
|-----------------|--------------------------------------------|-----|-----|--------------------|
| $R_{\theta JA}$ | Maximum Junction-to-Ambient <sup>A</sup>   | 70  | 90  | $^\circ\text{C/W}$ |
|                 | Maximum Junction-to-Ambient <sup>A D</sup> | 100 | 125 | $^\circ\text{C/W}$ |
| $R_{\theta JL}$ | Maximum Junction-to-Lead                   | 63  | 80  | $^\circ\text{C/W}$ |

## Electrical Characteristics (T<sub>a</sub>=25°C unless otherwise specified)

| Symbol                      | Parameter                             | Conditions                                                                                | Min  | Typ      | Max        | Units |
|-----------------------------|---------------------------------------|-------------------------------------------------------------------------------------------|------|----------|------------|-------|
| <b>STATIC PARAMETERS</b>    |                                       |                                                                                           |      |          |            |       |
| BV <sub>DSS</sub>           | Drain-Source Breakdown Voltage        | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V                                                | 30   |          |            | V     |
| I <sub>DSS</sub>            | Zero Gate Voltage Drain Current       | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V<br>T <sub>J</sub> =55°C                         |      |          | 1<br>5     | μA    |
| I <sub>GSS</sub>            | Gate-Body leakage current             | V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V                                                |      |          | 100        | nA    |
| V <sub>GS(th)</sub>         | Gate Threshold Voltage                | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                  | 0.65 | 1.05     | 1.45       | V     |
| I <sub>D(ON)</sub>          | On state drain current                | V <sub>GS</sub> =4.5V, V <sub>DS</sub> =5V                                                | 30   |          |            | A     |
| R <sub>DS(ON)</sub>         | Static Drain-Source On-Resistance     | V <sub>GS</sub> =10V, I <sub>D</sub> =5.7A<br>T <sub>J</sub> =125°C                       |      | 18<br>28 | 26.5<br>38 | mΩ    |
|                             |                                       | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A                                                 |      | 19       | 32         | mΩ    |
|                             |                                       | V <sub>GS</sub> =2.5V, I <sub>D</sub> =3A                                                 |      | 24       | 48         | mΩ    |
| g <sub>FS</sub>             | Forward Transconductance              | V <sub>DS</sub> =5V, I <sub>D</sub> =5.7A                                                 |      | 33       |            | S     |
| V <sub>SD</sub>             | Diode Forward Voltage                 | I <sub>S</sub> =1A, V <sub>GS</sub> =0V                                                   |      | 0.7      | 1          | V     |
| I <sub>S</sub>              | Maximum Body-Diode Continuous Current |                                                                                           |      |          | 2          | A     |
| <b>DYNAMIC PARAMETERS</b>   |                                       |                                                                                           |      |          |            |       |
| C <sub>iss</sub>            | Input Capacitance                     | V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz                                         |      | 630      |            | pF    |
| C <sub>oss</sub>            | Output Capacitance                    |                                                                                           |      | 75       |            | pF    |
| C <sub>rss</sub>            | Reverse Transfer Capacitance          |                                                                                           |      | 50       |            | pF    |
| R <sub>g</sub>              | Gate resistance                       | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                          | 1.5  | 3        | 4.5        | Ω     |
| <b>SWITCHING PARAMETERS</b> |                                       |                                                                                           |      |          |            |       |
| Q <sub>g</sub>              | Total Gate Charge                     | V <sub>GS</sub> =4.5V, V <sub>DS</sub> =15V, I <sub>D</sub> =5.7A                         |      | 6        | 7          | nC    |
| Q <sub>gs</sub>             | Gate Source Charge                    |                                                                                           |      | 1.3      |            | nC    |
| Q <sub>gd</sub>             | Gate Drain Charge                     |                                                                                           |      | 1.8      |            | nC    |
| t <sub>D(on)</sub>          | Turn-On DelayTime                     | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>L</sub> =2.6Ω,<br>R <sub>GEN</sub> =3Ω |      | 3        |            | ns    |
| t <sub>r</sub>              | Turn-On Rise Time                     |                                                                                           |      | 2.5      |            | ns    |
| t <sub>D(off)</sub>         | Turn-Off DelayTime                    |                                                                                           |      | 25       |            | ns    |
| t <sub>f</sub>              | Turn-Off Fall Time                    |                                                                                           |      | 4        |            | ns    |
| t <sub>rr</sub>             | Body Diode Reverse Recovery Time      | I <sub>F</sub> =5.7A, dI/dt=100A/μs                                                       |      | 8.5      |            | ns    |
| Q <sub>rr</sub>             | Body Diode Reverse Recovery Charge    | I <sub>F</sub> =5.7A, dI/dt=100A/μs                                                       |      | 2.6      |            | nC    |

A. The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25° C. The value in any given application depends on the user's specific board design.

B. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=150° C, using ≤ 10s junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150° C. Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub>=25° C.

D. The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, assuming a maximum junction temperature of T<sub>J(MAX)</sub>=150° C. The SOA curve provides a single pulse rating.

## Typical Characteristics

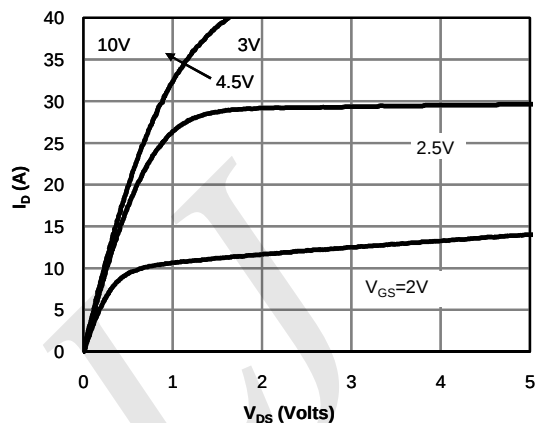


Figure 1: On-Region Characteristics (Note E)

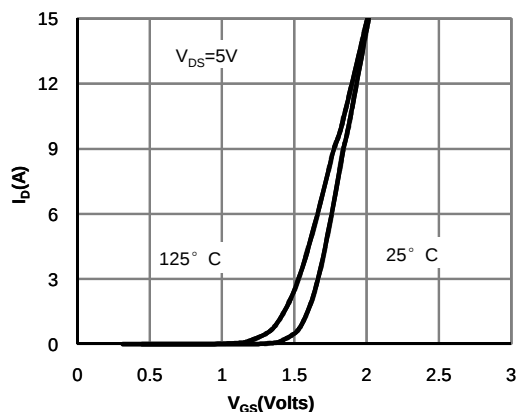


Figure 2: Transfer Characteristics (Note E)

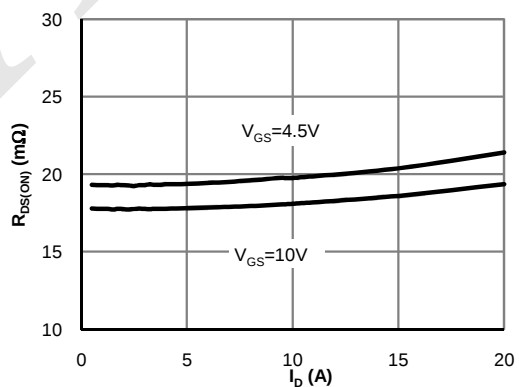


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

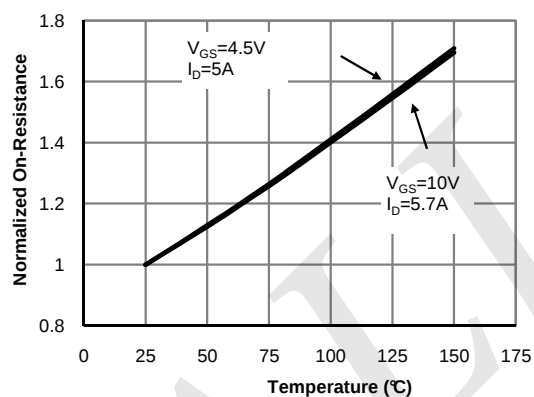


Figure 4: On-Resistance vs. Junction Temperature (Note E)

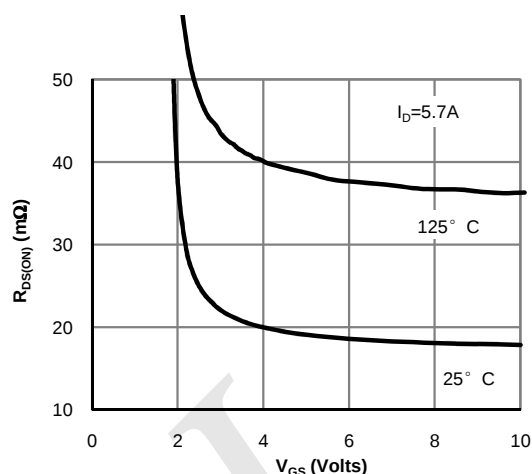


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

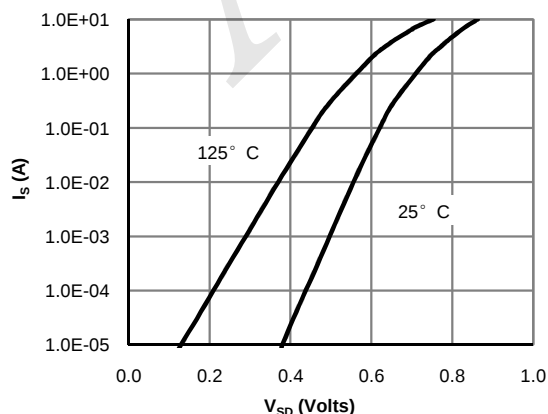


Figure 6: Body-Diode Characteristics (Note E)

## Typical Characteristics

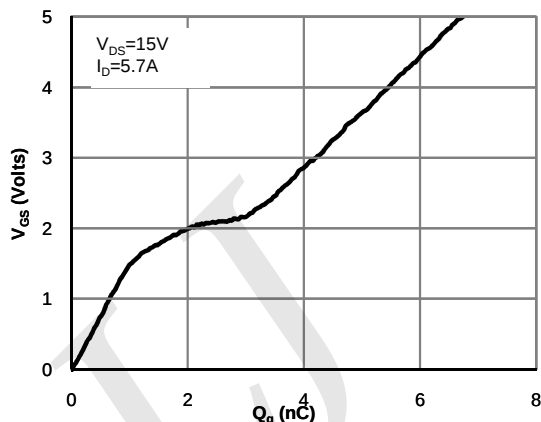


Figure 7: Gate-Charge Characteristics

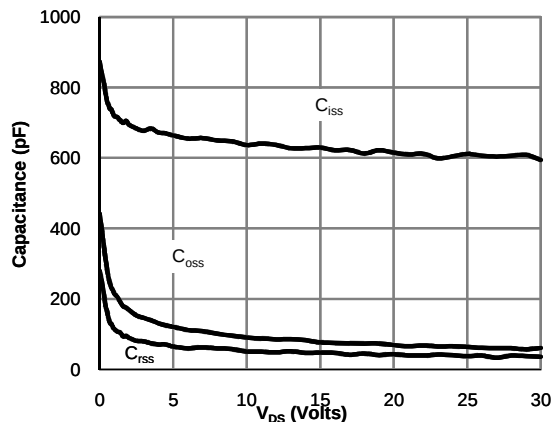


Figure 8: Capacitance Characteristics

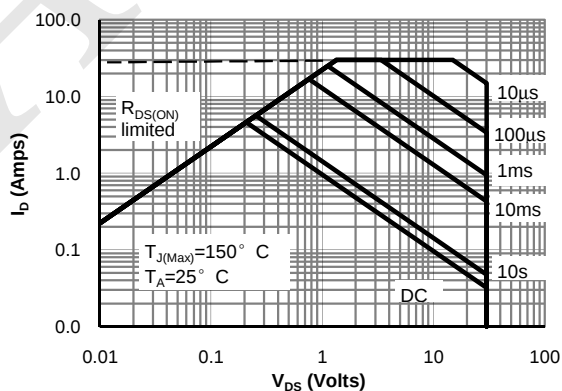


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

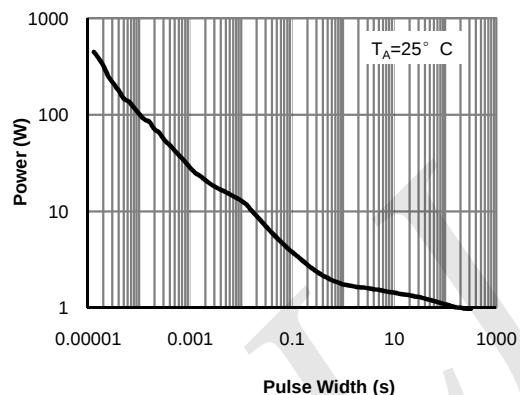


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

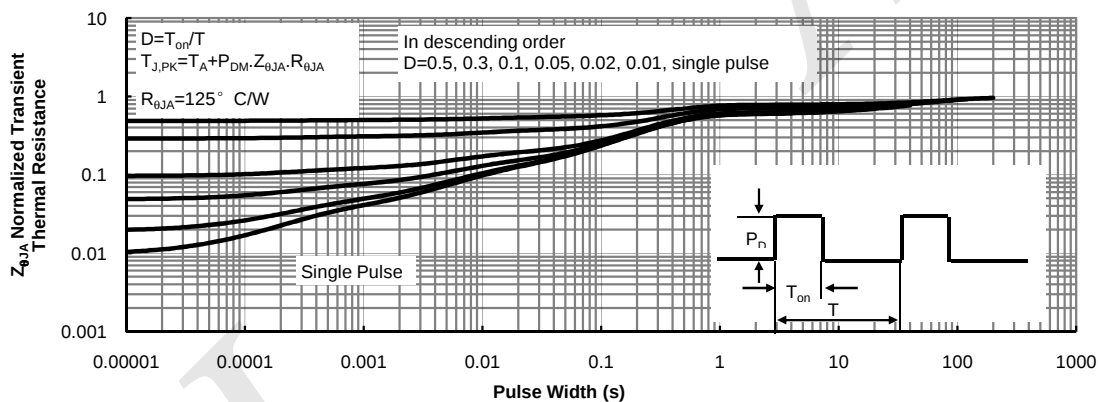
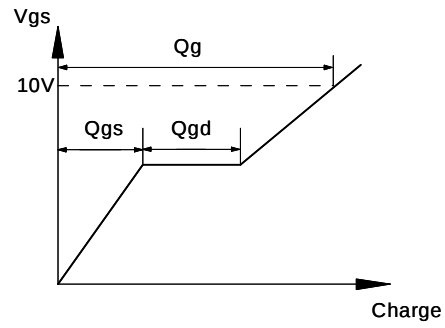
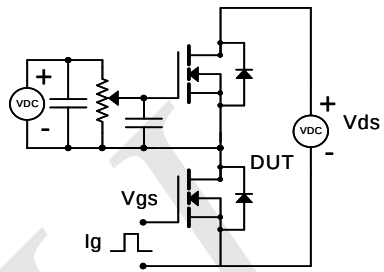
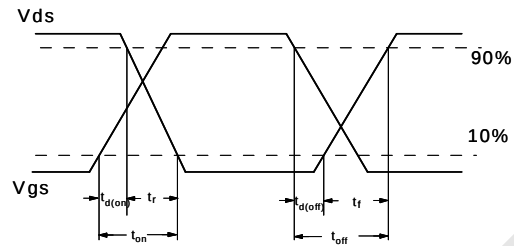
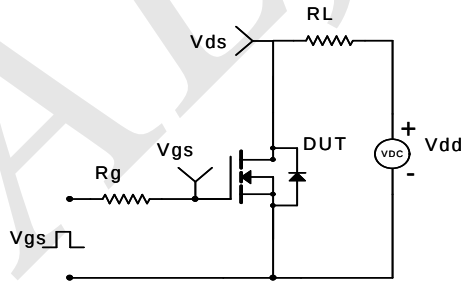


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

